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Application of Virtual Reality Technology in Photography Teaching

Pei Liu

(Assumption University, Thailand)

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Abstract—Under the background of the continuous development of digital technology, post-modernism photography emerged, which completely broke the traditional concept of photography culture and art form, encouraged computer post production and processing, and applied a large number of virtual images and digital technologies to photographic images. The visual form of works is no longer limited to planarization, and three-dimensional space and interactive presentation methods have emerged, which represents the upcoming image of a new photography era. Virtual reality technology provides possibilities for expanding teaching means and enriching teaching modes. The introduction of virtual reality technology into photography teaching will help consolidate the dominant position of students, enable teachers and students to complete teaching and learning in a more intuitive and visual way, and improve teaching quality and efficiency. The introduction of virtual reality technology into photography teaching requires teachers to constantly explore in order to better carry out teaching.

Index Terms—Art teaching, VR technology, Photography, Interactive application

I. INTRODUCTION

Photography has developed for 80 years since its birth. With the progress of the times, new image innovations have emerged in each period. Photographic images not only represent reality, but also build people's understanding of reality and virtual people's experience of reality, thus replacing reality as existence [(Jia Xueling, 2017)]. The emergence and development of virtual reality technology has undoubtedly broken people's experience of the traditional visual sense, and has more new characteristics of the contemporary visual sense. This has forced photographers and artists to start a new exploration of the visual expression and image presentation of photography [(Shen Chuan, Xie Luning, Ren Zhifei, 2004)].

Photography is a basic course of art, media, journalism and other majors in ordinary colleges and universities, as well as a public elective course of art. Because of its close connection with students' life and learning, it is loved and valued by students. To learn photography well, students need to have both relevant theoretical knowledge and relevant operating skills [(Wang Dejiang and Zhang Jita, 2004)]. With the popularization of digital photography, students need to understand the application methods of relevant equipment in photography courses [(Cao Yan, Yu Jian, 2014)]. There are some shortcomings in the previous photography teaching mode, such as it is difficult to intuitively show students the imaging principle, focal length and other knowledge points, and it is difficult to explain and operate the camera parameter content. However, it will be more conducive to the smooth development of photography teaching to innovate the teaching means with the help of information technology and explore a new model of photography teaching based on digital technology[(FIG. 1 to FIG. 2)].

FIG.1Samsung announces VR video camera

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FIG.2 Virtual reality technology camera Sphericam 2

II. VIRTUAL REALITY TECHNOLOGY

Virtual reality technology is a technology that combines virtual models created by computer technology with reality. Specifically, things or environments that are about to be realized and difficult to achieve, including things or environments that cannot be realized at all, are transmitted to users through the use of sensor devices to simulate visual, auditory, tactile and other sensory clues in virtual reality, making them feel as if they are actually in the environment [(Mary Werner Maria, 2005)]. The main characteristics of virtual reality are: multi perception, immersive, interactive. Multi perception refers to the user's sense of touch, hearing, taste and smell in addition to general vision in the virtual space, where he can perceive all actions and feelings [(Susan Sontag, 1999)]. The sense of immersive experience means that the user is almost identical with the real space in the virtual space, and can not even perceive any different sense. Theoretically, the sense of experience completely simulates the real space. Interaction means that users will get immediate feedback on their actions in the virtual environment [(Nicholas Mirzov, 2006)].

With the progress of 3D model construction technology, virtual characters or objects are gradually realistic and more realistic. In a virtual environment close to the real world, people can feel immersive and get real feelings [(Walter Benjamin, 1993)]. The interaction in virtual reality technology is to use the sensing objects in the virtual environment to make the audience get the feedback of the virtual system in real time. Designers use touch screens, helmet displays, gloves and other virtual reality devices to design human-computer interaction in virtual reality, and use these virtual reality devices to transfer the information obtained in the real scene to the operator, making it feel like communicating with objects directly in the real environment [(Heidegger, Lin Zhonglu ,2004)]. For example, in the "Digital Palace Museum" applet launched by the Palace Museum, designers used virtual reality technology to display the virtual exhibits of cultural relics. The audience can look closely, look far, and turn the exhibits up, down, left and right through simple interaction; At the same time, the applet provides a detailed cultural heritage background and knowledge introduction, which allows the audience to understand the relevant background knowledge while appreciating the exhibits [(William Mitchell, 2017)].

III. THE SIGNIFICANCE OF VIRTUAL OF VIRTUAL REALITY TECHNOLOGY TO TEACHING

The integration of virtual reality technology and teaching can expand teaching means, and its significance is reflected in the following aspects.

1. Reduced education costs

With the rapid development of higher education in China and the implementation of the "double first-class" construction in colleges and universities, some colleges and universities have the problem of insufficient educational funds, which leads to the imbalance of funding among majors. Therefore, relevant personnel began to attach importance to relying on information technology to explore more economical and effective learning and teaching methods. Relying on modern information technology, taking the information content of experimental teaching urgently needed by relevant majors as the direction, and taking the complete experimental teaching project as the basis, we will build a demonstration virtual simulation experimental teaching project, promote colleges and universities to actively explore a new model of personalized, intelligent and ubiquitous experimental teaching combining online and offline teaching, and form a reasonable professional layout and excellent teaching effect Open and share the effective new system of higher education informatization experimental teaching project demonstration, supporting the overall improvement of higher education teaching quality [(Guy. Debo, 2017)] The application of virtual reality technology in teaching has reduced the investment in places and equipment in the past teaching, optimized the use of teaching resources, reduced the cost of education, and solved the unbalanced development problem of colleges and universities due to regional economic differences to a certain extent.

2. Expanding the time and space of teaching

While reflecting on the previous teaching mode, people gradually realize the advantages of information technology. In the past, the teaching

mainly focused on one-way transfer of knowledge. The interaction between teachers and students was not strong, and was limited to the closeness of time and space. Under the network background supported by virtual reality technology, computer terminals and mobile terminals are shared across platforms, breaking the limitation of teaching time and space [(Baudrillard, 2017)]. The teaching and learning platform or system with virtual reality technology as the core can enable students to better carry out pre class knowledge preview, post class knowledge review, post class practice and feedback and other activities. In addition to teacher-student interaction, it also realizes rich human-computer interaction. Teachers can innovate teaching methods and means, so that students can no longer simply rely on teachers to carry out learning, but can learn anytime and anywhere, and their ability to learn independently has also been improved.

3. Improve learning interest and motivation

The modern educational concept has changed from teacher centered to student centered, and students have become the main body of learning. This breaks the limitations of the previous indoctrination teaching mode [(Baudrillard, 2005)]. Teachers should start with enhancing students' interest in learning, try to stimulate students' learning initiative and motivation, and then obtain more effective teaching results. Some students may be slack and lax in the learning process. At this time, teachers need to enhance their interest and motivation in learning. Virtual reality technology can make learning activities interesting, intuitive, visual and even full of games. It presents boring and abstract knowledge in an intuitive and visual perceptual form, making it easier for students to understand and remember. At the same time, it allows students to participate in interesting games and complete knowledge preview, learning and review. The development of information technology provides new methods and means for students' learning, which is helpful to improve the teaching effect.

IV. APPLICATION OF VIRTUAL REALITY TECHNOLOGY IN PHOTOGRAPHY TEACHING

1. Innovation of teaching mode of virtual reality technology integration teaching

Photography is a highly practical course. In the past, photography teaching generally used a teaching method that combines theory with practice. It was consolidated by explaining relevant knowledge points, supplemented by corresponding practical activities. Teachers were at the center of teaching, and it was difficult to pay attention to every student in the case of one to many. With the help of virtual reality technology to carry out teaching, the teacher-student interaction in teaching becomes human-computer interaction. As the assistant of teaching activities, teachers can use virtual reality technology to let students independently complete relevant learning activities according to teaching arrangements, so as to improve the effect of one-to-one teaching. Teachers should integrate virtual reality technology into photography teaching, grasp the key point of exploring teaching means and optimizing teaching effect with the help of new technology, rather than taking virtual reality technology as the whole of teaching. The previous teaching mode and the teaching mode based on information technology have their own advantages and disadvantages. Teachers should integrate and innovate on the basis of recognizing their advantages and design according to different teaching contents.

Modern information technology means such as' Internet plus', virtual simulation and artificial intelligence should be used to vigorously promote the reform of university teaching.The construction of high-quality courses and MOOC platforms at all levels is an effort to innovate the teaching mode. Teachers and relevant personnel should strive to introduce virtual reality technology into the teaching construction, realize better education resource sharing, and provide new ideas and new means for educators to innovate the teaching mode.

2. Improve the quality and efficiency of classroom teaching and visualize the teaching difficulties

The photography course not only teaches students to use the camera, but also enables students to understand the camera and master how to take beautiful photos with the camera. There are some abstract and difficult knowledge points in photography teaching, which is also the difficulty of photography teaching. Many students will be curious about how the camera works and how the picture is formed when the shutter key is pressed. Curiosity about photography is the motivation for students to learn photography. In the past photography teaching, due to the limitations of teaching conditions, teachers often use blackboard writing combined with multimedia to explain the relevant content by using the construction pictures of cameras. Some students have ambiguous understanding of this part of knowledge. By introducing virtual reality technology into photography teaching, teachers can use relevant technologies to build realistic camera component

models, present the process of shooting and imaging in the form of interaction and interactive operation, and display the parts that students are interested in in a scientific, intuitive and visual form. The camera imaging process involves shutter, aperture, sensitivity and other knowledge. In the past teaching, it is difficult for teachers to intuitively demonstrate the real object and working principle of shutter and aperture, and these knowledge directly affect students' grasp of subsequent knowledge, such as the similarities and differences between mechanical shutter and electronic shutter, and the synchronization of flash and shutter in flash photography. With the help of virtual reality system to display camera models, students can intuitively understand the styles and working principles of different parts of the camera during interactive operation. Through learning these contents, students have a certain basis for learning, and can understand theoretical knowledge through practical experience and consolidate it.

3. Guided interactive teaching, optimizing practical teaching activities

The practice link is an important part of photography teaching. In the past, most students took pictures separately, and then teachers concentrated on comments. It is difficult to achieve one-to-one communication between teachers and students. At the same time, because students need to use professional equipment in photography, the school has limited equipment, and some students have difficulties in purchasing equipment. If students spend more time learning to use equipment in the process of practice, it is easy to affect the teaching progress; At the same time, students are also prone to encounter some problems when exploring the use of equipment by themselves. With the help of virtual reality technology, students can carry out interactive virtual experiments. Through human-computer interaction, they can practice virtual operation of practice content in advance. They can not only master the practice process, but also know in advance the problems that may be encountered in the practice process and try to solve them. For example, in the practice of operating cameras, teachers guide students to participate in interactive virtual experiments. Students can correctly understand and master the composition of cameras through interactive operation of virtual cameras under the correct guidance of the virtual system; Master the correct operation of the camera

Law; Intuitively recognize and understand the aperture, shutter and even light sensitive devices (CCD or CMOS). Photography, as an artistic creation, is relatively dependent on the camera. Many shooting effects can only be achieved successfully by adjusting the camera. For example, by using the high-speed shutter and low-speed shutter of the camera respectively, pictures with different effects can be obtained. In the previous teaching mode, it is difficult for students to analyze its principle, while in the virtual reality system, teachers can simulate the similarities and differences of the imaging process of the shooting object during exposure through interactive demonstration of the change of shutter speed, so that students can understand the reasons for different imaging. On this basis, when using the camera, students can complete the practice faster and more effectively, and achieve better learning results.

V. THE CONCLUDING

In the process of exploring photography teaching, relying on new technology to master new teaching methods and new teaching models has always been the focus of the author's attention. Virtual reality redefines photography, which is wonderful. People can take pictures of the real world and put them in a virtual reality environment. From the use of slides, the assistance of TV and movies, the popularity of computer multimedia classrooms, and the application of the current popular virtual reality technology, the author found that education has always been open to new technologies. These technologies are not specially prepared for education, and it is not easy to introduce them into photography teaching. Teachers and relevant personnel need to start research from the characteristics of education itself, which requires a long-term process.

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Pei Liuis a Ph.DCandidate, GraduateSchool of Business and Advanced Technology Management, Assumption University, Thailand.(E-mail: 592947743@QQ.COM).

She was born in Chengdu city, Sichuan, China on 7th June,1990. She graduated from Renmin University of China with a master's degree in educational administration. She is the director of the basic calligraphy education branch of the (National) education calligraphy and Painting Association, the deputy secretary general and executive director of the Calligraphy Education Professional Committee of Sichuan Education Society, the executive director of the Art Education Professional Committee of Sichuan Education Society, and the executive director of the film and television education professional Committee of Sichuan Education Society.

She is the editorial board member of the book “theory and practice of humanistic education in the new era”, a key planning project of China's national publishing house. She participated in China's national projects “Research on the activity mode of art education workshop in primary and secondary schools” and “Research on the inheritance of Chinese traditional culture in art disciplines in senior high schools” and served as the main researcher. She was awarded the honorary title of “advanced individual” in Sichuan Province by the people's Government of Sichuan Province on the “Sixth National College Student Art Exhibition”. At the same time, she is a calligraphy judge of the art talent competition for primary and secondary schools in Sichuan Province, China. Her article “application and teaching exploration of virtual reality technology in art approval” was published in the International Journal IJIET, and her article “on the teaching practice of strengthening the protection and inheritance of China's intangible cultural heritage - a case study of Tianfu new area, Chengdu, Sichuan” was published in the International Journal IJSHI. The article “Inquiry Teaching of Chinese traditional painting based on virtual reality technology - take Han Xizai's banquet as an example” was published in the International Journal ELTLS. She published 10 articles in China to China's national art core publications “Chinese primary and secondary school art” and “Calligraphy Education”.